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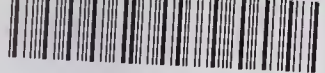
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The Analyses of Optical Atomic Spectra

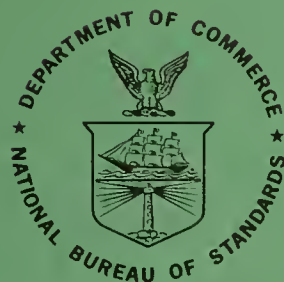
Section 2

$^{24}\text{Cr} - ^{41}\text{Nb}$

NAT'L INST. OF STAND & TECH R.I.C.



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United States Department of Commerce

National Bureau of Standards

Special Publication 306—2

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1969

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Bibliography
on
The Analyses of Optical Atomic Spectra
Section 2

The Spectra of Chromium, Manganese, Iron, Cobalt,
Nickel, Copper, Zinc, Gallium, Germanium, Arsenic,
Selenium, Bromine, Krypton, Rubidium, Strontium,
Yttrium, Zirconium, and Niobium

Charlotte E. Moore

Office of Standard Reference Data
National Bureau of Standards
Washington, D. C. 20234



(National Bureau of Standards)^t Special Publication 306—2

Issued February 1969

Abstract

The three published volumes on "Atomic Energy Levels," NBS Circ. 467, contain for each spectrum the bibliography that was used in compiling the data. The present work is a continuation of these bibliographies arranged in the same form. The time interval is the span from the respective dates of the earlier publications to the present. The selection of references is restricted to those needed for the preparation of revised tables of atomic energy levels and multiplets.

The bibliography is being published by Sections, each of which covers the same elements as the respective volumes of AEL. Section 1 was issued in September 1968; it contains references for the elements ^1H through ^{23}V , corresponding to AEL Volume I.

The present Section is similarly arranged, giving references to the spectra of the elements ^{24}Cr through ^{41}Nb , corresponding to AEL Volume II. For a given element the spectra are listed in order of increasing stage of ionization.

The original papers have been examined for nearly all of the quoted references.

Key Words: Spectra, Atomic; Analyses of Atomic Spectra; Elements, Spectra of Cr through Nb; Bibliography, Atomic Spectra; Atomic Spectra, Cr through Nb; References to Atomic Spectra.

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Index to Spectra

Element	Z	Spectrum	Page	Element	Z	Spectrum	Page
Chromium	24	Cr I	1	Iron	26	Fe I	12
		Cr II	1			Fe II	13
		Cr III	2			Fe III	14
		Cr IV	2			Fe IV	14
		Cr V	2			Fe V	15
		Cr VI	2			Fe VI	15
		Cr VII	3			Fe VII	15
		Cr VIII	3			Fe VIII	15
		Cr IX	4			Fe IX	16
		Cr X	4			Fe X	17
		Cr XI	4			Fe XI	17
		Cr XII	5			Fe XII	18
		Cr XIII	5			Fe XIII	19
		Cr XIV	5			Fe XIV	19
		Cr XV	5			Fe XV	20
		Cr XVI	6			Fe XVI	20
		Cr XXIII	6			Fe XVII	21
Manganese	25					Fe XVIII	21
		Mn I	6			Fe XIX	21
		Mn II	7			Fe XX	21
		Mn III	7			Fe XXI	22
		Mn IV	8			Fe XXII	22
		Mn V	8			Fe XXIII	22
		Mn VI	8			Fe XXIV	22
		Mn VII	9			Fe XXV	22
		Mn VIII	9			Fe XXVI	22
		Mn IX	9	Cobalt	27	Co I	23
		Mn X	10			Co II	23
		Mn XI	10			Co III	23
		Mn XII	10			Co IV	24
		Mn XIII	10			Co V	24
		Mn XIV	11			Co VI	24
		Mn XV	11			Co VII	24
		Mn XVI	11			Co VIII	24
		Mn XVII	11			Co IX	24
		Mn XXIV	11			Co X	24
						Co XI	25
						Co XII	25
						Co XVII	25
						Co XVIII	25
						Co XIX	26
						Co XXVI	26

Index to Spectra—Continued

Element	Z	Spectrum	Page	Element	Z	Spectrum	Page
Nickel	28	Ni I	26	Gallium	31	Ga I	37
		Ni II	27			Ga II	38
		Ni III	27			Ga IV	38
		Ni IV	28			Ga V	38
		Ni VII	28	Germanium	32	Ge I	39
		Ni VIII	28			Ge II	40
		Ni IX	28			Ge VI	40
		Ni X	29	Arsenic	33	As I	41
		Ni XI	29			As II	41
		Ni XII	30			As III	41
		Ni XIII	30			As IV	41
		Ni XIV	31			As VII	42
		Ni XV	31	Selenium	34	Se I	42
		Ni XVII	31			Se II	42
		Ni XVIII	31			Se III	42
		Ni XIX	31			Se IV	42
		Ni XX	32			Se V	42
		Ni XXVII	32			Se VIII	43
Copper	29	Cu I	32	Bromine	35	Br I	43
		Cu II	33			Br II	44
		Cu III	33			Br III	44
		Cu IV	34			Br IV	44
		Cu X	34			Br V	44
		Cu XI	34			Br VI	44
		Cu XII	34			Br VII	45
		Cu XIX	34			Br IX	45
		Cu XX	34	Krypton	36	Kr I	45
		Cu XXI	35			Kr II	48
Zinc	30	Cu XXVIII	35			Kr III	48
		Zn I	35			Kr IV	49
		Zn II	36			Kr V	49
		Zn III	36			Kr VI	49
		Zn IV	36			Kr VII	49
		Zn XI	36			Kr VIII	49
		Zn XII	36			Kr IX	49
		Zn XIII	37			Kr X	50
		Zn XX	37				
		Zn XXI	37				
		Zn XXIX	37				

Index to Spectra—Continued

Element	Z	Spectrum	Page	Element	Z	Spectrum	Page
Rubidium	37	Rb I	50	Zirconium	40	Zr I	55
		Rb II	51			Zr II	55
		Rb XI	51			Zr III	55
Strontium	38	Sr I	51			Zr IV	56
		Sr II	52			Zr V	56
		Sr III	52			Zr VI	56
		Sr IV	52			Zr VII	56
		Sr XII	53			Zr VIII	56
Yttrium	39	Y I	53			Zr IX	56
		Y II	53			Zr XIV	56
		Y III	54	Niobium	41	Nb I	57
		Y IV	54			Nb II	57
		Y V	54			Nb III	57
		Y XIII	54			Nb V	57

Bibliography

on

The Analyses of Optical Atomic Spectra

Charlotte E. Moore

The present bibliography is a continuation of the work published in September 1968 [1].¹ Selected references are listed to meet a steady demand for data on atomic spectra. No attempt has been made to publish complete reference lists on atomic spectra including numerous specialized subjects. Those listed have been chosen for individual spectra on the same basis of selection as was used for the Volumes on "Atomic Energy Levels" [2]. They are references that deal with the outer structure of atoms as revealed by their optical spectra. They cover the time interval between the publication of the respective Volumes of "Atomic Energy Levels" and the present time.

Section 1 [1] dealt with the elements ^1H through ^{23}V from 1949 to the middle of 1968. Earlier references were given in "Atomic Energy Levels" Volume I. The present Section, No. 2 in the Series, covers the elements ^{24}Cr through ^{41}Nb , corresponding to Volume II, which was issued in 1952.

As in Section 1 the content of individual papers is briefly described by key letters or words. The letters have the following meanings:

C L	Classified lines
E D	Energy level diagram
G D	Grotrian diagram
I P	Ionization potential
I S	Isotope shift
T	Terms
	(and/ or energy levels)
W L	Wavelength
Z E	Zeeman effect
[]	Forbidden transitions
hfs	Hyperfine structure
Osc. Str.	Oscillator strength
x	Correction connecting sets of terms of different multiplicities

The letters "A" and "L" entered in parentheses before the date of the reference denote, respectively, that the paper is an "Abstract" or a "Letter to the Editor."

In general, the references have been selected as those needed to revise and extend the author's Tables of Atomic Energy Levels [2] and Multiplets [3] [4] [5]. They refer mostly to laboratory observations and analyses. There are a few special cases where forbidden lines observed in coronal or nebular spectra provide reliable in-

formation on intervals of ground terms of selected spectra. Similarly, some papers on theoretical work are also extremely useful. Such references are included.

A limited number of scattered references on related topics such as hyperfine structure, Stark Effect, Isotope Shift, etc., are also included, but no effort has been made to cover these related subjects completely.

In tabulating the references for a given spectrum the overall plan has been to arrange them in alphabetical order by author and by year, starting with the earlier papers. Owing to the use of the photographic method for publication, this order has not been followed strictly. If excellent reference material became available after the final typing had been completed, additional references were inserted under the proper spectra where space permitted. This has introduced some irregularities in arrangement, but it has also made the bibliography more useful.

Nearly all of the references quoted here have been examined by the author. Only a few which were not available have been copied on the basis of abstracts found in the literature.

The author is grateful to all who have generously contributed material for inclusion here. Some have made special effort to furnish current references and reprints, and to outline programs in progress in various laboratories. B. Edlén and L. Minnhagen have kindly suggested important corrections in the manuscript, which are much appreciated. Special thanks are due, also, to Isabel D. Murray for her meticulous care in preparing the press copy of the manuscript.

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Cu xii

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